इंटरनेट मानक

Disclosure to Promote the Right To Information

Whereas the Parliament of India has set out to provide a practical regime of right to information for citizens to secure access to information under the control of public authorities, in order to promote transparency and accountability in the working of every public authority, and whereas the attached publication of the Bureau of Indian Standards is of particular interest to the public, particularly disadvantaged communities and those engaged in the pursuit of education and knowledge, the attached public safety standard is made available to promote the timely dissemination of this information in an accurate manner to the public.

"जानने का अधिकार, जीने का अधिकार"
Mazdoor Kisan Shakti Sangathan
"The Right to Information, The Right to Live"

"पुराने को छोड नये के तरफ"
Jawaharlal Nehru
"Step Out From the Old to the New"

IS 8961 (1978): Chlormequat Chloride, Technical [FAD 1: Pesticides and Pesticides Residue Analysis]

"ज्ञान से एक नये भारत का निर्माण"
Satyanarayan Gangaram Pitroda
"Invent a New India Using Knowledge"

Act Number 22 of 2005
The Indian Parliament
RIGHT TO INFORMATION

Made Available By
Public.Resource.Org

"ज्ञान एक ऐसा खजाना है जो कभी चुराया नहीं जा सकता है"
Bhartṛhari—Nītiśatakam
"Knowledge is such a treasure which cannot be stolen"

BLANK PAGE

BRUTUM FULMEN

IGNORANTIA JURIS NON EXCUSAT

PROTECTED BY COPYRIGHT

IS : 8961 - 1978

(Reaffirmed 2001)

Indian Standard

SPECIFICATION FOR CHLORMEQUAT CHLORIDE, TECHNICAL

UDC 632·951 CHL

© *Copyright* 1979

INDIAN STANDARDS INSTITUTION
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002

Price Rs 5.00 Gr 3

March 1979

Indian Standard

SPECIFICATION FOR CHLORMEQUAT CHLORIDE, TECHNICAL

Pest Control Sectional Committee, AFCDC 6

Chairman	*Representing*
DR S. N. BANERJEE	Directorate of Plant Protection, Quarantine & Storage (Ministry of Agriculture & Irrigation), Faridabad
Members	
DR N. S. AGARWAL	Ministry of Agriculture & Irrigation (Department of Food)
DR K. KRISHNAMURTHY (*Alternate*)	
DR P. N. AGARWAL	Ministry of Defence (R & D)
DR N. P. RAO (*Alternate*)	
DR H. L. BAMI	Central Forensic Science Laboratory (Central Bureau of Investigation), New Delhi
DR B. BANERJEE	Tea Research Association, Calcutta
DR G. SATYANARAYANA (*Alternate*)	
DR S. R. BAROOAH	Pesticides Formulators Association of India (S. S. I.), Bombay
DR N. K. BASU	The Alkali & Chemical Corporation of India Limited, Calcutta
SHRI S. R. NENE (*Alternate*)	
DR A. K. BHATNAGAR	Hindustan Insecticides Limited, New Delhi
SHRI C. C. ABRAHAM (*Alternate*)	
DR S. S. CHADHA	Pesticides Association of India, New Delhi
SHRI S. K. RAMAN (*Alternate*)	
CHIEF PLANT PROTECTION OFFICER	Department of Agriculture, Government of Maharashtra, Bombay
CHEMIST INCHARGE, INSECTICIDES TESTING LABORATORY (*Alternate*)	
SHRI V. G. DESHPANDE	CIBA-Geigy of India Limited, Bombay
SHRI E. A. ALMEIDA (*Alternate*)	
SHRI O. P. DHAMIJA	Export Inspection Council of India, New Delhi
SHRI P. P. RANGA RAO (*Alternate*)	
DR M. S. DHATT	National Malaria Eradication Programme, Delhi
DIRECTOR GENERAL, ARMED FORCES MEDICAL SERVICES	Directorate General, Armed Forces Medical Services (Ministry of Defence), New Delhi
AVM J. K. SEHGAL (*Alternate*)	

(*Continued on page* 2)

© *Copyright* 1979
INDIAN STANDARDS INSTITUTION
This publication is protected under the *Indian Copyright Act* (XIV of 1957) and reproduction in whole or in part by any means except with written permission of the publisher shall be deemed to be an infringement of copyright under the said Act.

(*Continued from page* 1)

Members	*Representing*
Director of Agriculture	Department of Agriculture, Government of Uttar Pradesh, Lucknow
Deputy Director (Plant Protection) (*Alternate*)	
Drugs Controller (India)	Indian Pharmacopoeia Committee (Ministry of Health and Family Welfare), New Delhi
Shri M. Ravikant (*Alternate*)	
Shri G. D. Gokhale	Bombay Chemicals Private Limited, Bombay
Shri V. V. Ketkar (*Alternate*)	
Joint Director of Agriculture (Development & ICP)	Department of Agriculture, Government of Karnataka, Mysore
Deputy Director of Agriculture (Plant Protection) (*Alternate*)	
Dr R. L. Kalra	Punjab Agricultural University, Ludhiana
Dr R. P. Chawla (*Alternate*)	
Dr Krishan Singh	Indian Institute of Sugarcane Research (ICAR), Lucknow
Dr S. C. Srivastava (*Alternate*)	
Shri S. G. Krishnan	National Organic Chemical Industries Limited, Bombay
Dr J. S. Verma (*Alternate*)	
Shri S. K. Luthra	Directorate General of Technical Development, New Delhi
Shri S. C. Bajaj (*Alternate*)	
Shri S. K. Majumdar	Central Food Technological Research Institute (CSIR), Mysore
Shri M. Muthu (*Alternate*)	
Shri K. S. Mehta	Bharat Pulverising Mills Private Limited, Bombay
Shri S. Chatterji (*Alternate*)	
Dr A. L. Mookerjee	Cyanamid India Limited, Bombay
Shri J. P. Parikh (*Alternate*)	
Dr S. K. Mukherjee	Agricultural Chemicals Division, Indian Agricultural Research Institute (ICAR), New Delhi
Dr N. K. Roy (*Alternate*)	
Shri K. R. Narayana Rao	Food Corporation of India, New Delhi
Smt K. K. M. Bhavnani (*Alternate*)	
Shri I. Narsareddy	Department of Agriculture, Government of Andhra Pradesh, Hyderabad
Shri K. Satyanarayana Rao (*Alternate*)	
Dr K. D. Paharia	Central Insecticides Board, Directorate of Plant Protection, Quarantine & Storage (Ministry of Agriculture & Irrigation), Faridabad
Dr S. Y. Pandit	Bayer (India) Limited, Bombay
Shri D. N. Nakhate (*Alternate*)	
Dr T. N. Parthasarathy	Regional Research Laboratory (CSIR), Hyderabad
Dr J. Madhusudhan Rao (*Alternate*)	
Shri M. A. Patel	Department of Agriculture, Government of Gujarat, Ahmadabad
Shri Y. A. Pradhan	Rallis India Limited, Bombay
Dr Z. J. Kapadia (*Alternate*)	

(*Continued on page* 9)

Indian Standard

SPECIFICATION FOR CHLORMEQUAT CHLORIDE, TECHNICAL

0. FOREWORD

0.1 This Indian Standard was adopted by the Indian Standards Institution on 30 October 1978, after the draft finalized by the Pest Control Sectional Committee had been approved by the Agricultural and Food Products Division Council and the Chemical Division Council.

0.2 Chlormequat chloride is a plant growth regulant which usually induces retardation of shoot elongation and vegetative growth in most of the plants. It has been used in agriculture for increasing yields and improvement in quality in various crops.

0.3 Chlormequat chloride is the accepted common name by the International Organization for Standardization (ISO) for the pesticidal chemical (2-chloroethyl) trimethyl ammonium chloride. The empirical and structural formulae and the molecular mass of chlormequat chloride are indicated below:

Empirical Formula	*Structural Formula*	*Molecular Mass*
$C_5H_{13}Cl_2N$	$[CH_2Cl . CH_2 . N^+(CH_3)_3]\ Cl^-$	158·1

0.4 In the preparation of this standard due consideration has been given to the provisions of the Insecticides Act, 1968 and the Rules framed thereunder. However, this standard is subject to the restrictions imposed under these, wherever applicable.

0.5 For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS : 2-1960*. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

---

*Rules for rounding off numerical values (*revised*).

1. SCOPE

1.1 This standard prescribes the requirements and the methods of sampling and test for chlormequat chloride, technical.

2. REQUIREMENTS

2.1 Description — Chlormequat chloride, technical, shall be in the form of white crystalline solid free from extraneous impurities or added modifying agents, with a typical fish-like odour.

2.2 The material shall also comply with the requirements specified in Table 1.

TABLE 1 REQUIREMENTS FOR CHLORMEQUAT CHLORIDE, TECHNICAL

(*Clauses* 2.2 *and* 5.1)

Sl No.	Characteristic	Requirement	Method of Test, Ref to	
			Appendix of this Standard	Cl No. of IS : 6940-1973*
(1)	(2)	(3)	(4)	(5)
i)	Chlormequat chloride content, percent by mass, on dry basis, *Min*	97	A	—
ii)	Choline chloride content, percent by mass on dry basis, *Max*	1	A	—
iii)	Ratio between ionic chloride and total chlorides	1 : 1·9 to 2·1	A	—
iv)	Material insoluble in water, *Max*	0·2	B	—
v)	Acidity (as H_2SO_4), percent by mass, *Max*	0·3	—	11.3

*Methods of tests for pesticides and their formulations.

3. PACKING AND MARKING

3.1 Packing — The material shall be packed in clean and dry airtight containers made of mild steel or fibre board lined with polyethylene of thickness not less than 0·062 mm or high density polyethylene. The containers shall also comply with general requirements as stipulated in **2** of IS : 8190 (Part I)-1976*.

---

*Requirements for packing of pesticides: Part I Solid pesticides.

3.2 Marking — The container shall bear legibly and indelibly the following information in addition to information as is necessary under the Insecticides Act and Rules:

a) Name of the material;
b) Name of manufacturer;
c) Date of manufacture;
d) Batch number;
e) Chlormequat chloride content, percent (*m/m*);
f) Net mass of the contents; and
g) The cautionary notice as worded in the Insecticides Act and Rules.

3.2.1 Each container may also be marked with the ISI Certification Mark.

NOTE — The use of the ISI Certification Mark is governed by the provisions of the Indian Standards Institution (Certification Marks) Act and the Rules and Regulations made thereunder. The ISI mark on products covered by an Indian Standard conveys the assurance that they have been produced to comply with the requirements of that standard under a well-defined system of inspection, testing and quality control which is devised and supervised by ISI and operated by the producer. ISI marked products are also continuously checked by ISI for conformity to that standard as a further safeguard. Details of conditions under which a licence for the use of the ISI Certification Mark may be granted to manufacturers or processors, may be obtained from the Indian Standards Institution.

4. SAMPLING

4.1 Representative samples of the material shall be drawn as prescribed in 'Indian Standard Methods of sampling for pesticides and their formulations' (*under preparation*).

NOTE — Till such time the standard under preparation is published, the matter shall be as agreed to between the concerned parties.

5. TESTS

5.1 Tests shall be carried out by appropriate methods referred in col 4 and 5 of Table 1.

5.1.1 Chlormequat chloride content may also be determined gravimetrically by accurately weighing 1·0 g of the anhydrous sample and diluting it to 200 ml in a volumetric flask. Take a 20-ml aliquot of this in a 125-ml conical flask and add one drop of 10 percent aluminium chloride solution and 20 ml of 2 percent sodium tetraphenylboron solution. Filter the precipitate through medium porosity glass funnel after 30 minutes and wash four times with distilled water. Dry at 100°C to a constant mass:

$$\text{Chlormequat, percent by mass} = \frac{\text{Mass of precipitate} \times 356{\cdot}7}{\text{Mass of sample}}$$

$$\text{Choline chloride, percent by mass} = \frac{\text{Mass of precipitate} \times 3{\cdot}298}{\text{Mass of sample}}$$

5.2 Quality of Reagents — Unless specified otherwise, pure chemicals and distilled water (*see* IS : 1070-1977*) shall be employed in the tests.

NOTE — ' Pure chemicals ' shall mean chemicals that do not contain impurities which affect the results of the analysis.

APPENDIX A

[*Table* 1, *Items* (i), (ii) *and* (iii)]

DETERMINATION OF CHLORMEQUAT CHLORIDE, CHOLINE CHLORIDE CONTENT AND RATIO BETWEEN IONIC CHLORIDE AND TOTAL CHLORIDE

A-1. POTENTIOMETRIC METHOD

A-1.1 Principle — By potentiometric titration of chloride ions in the untreated specimen and the chlorine ions in the sample after saponification in alkaline medium, both chlormequat chloride as well as choline chloride can be determined.

A-1.2 Apparatus

A-1.2.1 *Potentiometer* — with recorder and following setting:

Voltage range — 1 000 mV

Centre voltage — 500 mV

Titration speed — 1 ml reagent/min.

A-1.2.2 *Silver-Calomel Electrode* — combined

A-1.2.3 *Magnetic Stirrer*

A-1.3 Reagents

A-1.3.1 *Sodium Hydroxide* — 2 N.

A-1.3.2 *Silver Nitrate* — 0·1 N.

A-1.3.3 *Nitric Acid* — 1 : 1 (*v*/*v*).

---

*Specification for water for general laboratory use (*second revision*).

A-1.4 Procedure

A-1.4.1 *Determination of Anionic Chlorine in the Untreated Sample* — Weigh accurately about 0·5 g of the anhydrous sample, dissolve in water and acidify with nitric acid. Titrate the solution potentiometrically against silver nitrate while stirring, using a silver-calomel electrode. Stop the titration approximately 1 ml after the point of inflexion.

A-1.4.2 *Determination of Anionic Chlorine after Hydrolysis* — Weigh accurately about 0·5 g of the anhydrous sample in a conical flask, dissolve the same in 50 ml of sodium hydroxide and reflux for 2 hours. Cool, acidify the solution with 50 ml nitric acid. Titrate potentiometrically against silver nitrate using a silver-calomel electrode. The titration is stopped 1 ml after the point of inflexion.

A-1.5 Calculations

$$\text{Ionic chloride, percent by mass} = \frac{V_1 \times 0{\cdot}3546}{M_1}$$

$$\text{Total chloride, percent by mass} = \frac{V_2 \times 0{\cdot}3546}{M_2}$$

$$\text{Chlormequat chloride content, percent by mass} = \left[\frac{V_2}{M_2} - \frac{V_1}{M_1}\right] \times 1{\cdot}581$$

$$\text{Choline chloride content, percent by mass} = \left[\frac{2V_1}{M_1} - \frac{V_2}{M_2}\right] \times 1{\cdot}396$$

where

V_1 = volume in ml of silver nitrate used in **A-1.4.1**,

V_2 = volume in ml of silver nitrate used in **A-1.4.2**,

M_1 = mass of sample in g taken in **A-1.4.1**, and

M_2 = mass of sample in g taken in **A-1.4.2**.

APPENDIX B

[*Table* 1, *Item* (iv)]

DETERMINATION OF MATERIAL INSOLUBLE IN WATER

B-1. PROCEDURE

B-1.1 Weigh accurately about 10 g of the material and dissolve in 100 ml of distilled water. Filter the solution through a tared sintered glass crucible. Wash the crucible with distilled water till the filtrate is chloride free. Dry at 110°C for 2 hours, cool and then weigh.

B-2. CALCULATION

B-2.1 Material insoluble in water, percent by mass $= \frac{100\,m}{M}$

where

m = mass in g of the residue obtained after drying, and
M = mass in g of the material taken for the test.

(*Continued from page* 2)

Members	*Representing*
Dr Rattan Lal	Entomology Division, Indian Agricultural Research Institute (ICAR), New Delhi
Dr A. K. Sen	Ministry of Defence (DGI)
Shri P. N. Luthra (*Alternate*)	
Dr K. S. Singh	Indian Veterinary Research Institute (ICAR), Izatnagar
Shri S. C. Srivastava (*Alternate*)	
Shri N. S. Venkataraman	Department of Agriculture, Government of Tamil Nadu, Madras
Dr P. R. Venkateswaran	Union Carbide India Limited, New Delhi
Dr K. N. Shrivastava (*Alternate*)	
Shri N. G. Wagle	Pest Control (India) Private Limited, Bombay
Shri M. R. Bajikar (*Alternate*)	
Dr B. L. Wattal	National Institute of Communicable Diseases, Delhi
Shri V. N. Bhatnagar (*Alternate*)	
Shri T. Purnanandam, Deputy Director (Agri & Food)	Director General, ISI (*Ex-officio Member*)

Secretary

Shri Lajinder Singh
Assistant Director (Agri & Food), ISI

Pesticides Subcommittee, AFCDC 6 : 1

Convener	
Dr K. D. Paharia	Central Insecticides Board, Directorate of Plant Protection, Quarantine & Storage (Ministry of Agriculture & Irrigation), Faridabad

Members	
Dr N. S. Agarwal	Ministry of Agriculture & Irrigation (Department of Food)
Dr K. Krishnamurthy (*Alternate*)	
Shri E. A. Almeida	CIBA-Geigy of India Limited, Bombay
Shri F. Quadros (*Alternate*)	
Dr H. L. Bami	Central Forensic Science Laboratory (Central Bureau of Investigation), New Delhi
Dr N. K. Basu	The Alkali & Chemical Corporation of India Limited, Calcutta
Shri S. R. Nene (*Alternate*)	
Dr A. K. Bhatnagar	Hindustan Insecticides Limited, New Delhi
Shri C. C. Abraham (*Alternate*)	
Dr M. S. Dhatt	National Malaria Eradication Programme, Delhi
Shri G. D. Gokhale	Bombay Chemicals Private Limited, Bombay
Shri V. V. Ketkar (*Alternate*)	
Shri D. R. Gupta	Central Revenues Control Laboratory (Ministry of Finance), New Delhi
Shri S. Krishnamurthy (*Alternate*)	

(*Continued on page* 10)

(Continued from page 9)

Members	*Representing*
Dr Kalyan Singh	Chander Sekhar Azad University of Agriculture & Technology, Kanpur
Shri K. S. Mehta	Bharat Pulverising Mills Private Limited, Bombay
Shri S. Chatterji (*Alternate*)	
Shri L. S. Mirle	Agromore Limited, Bangalore
Dr S. K. Mukherjee	Agricultural Chemicals Division, Indian Agricultural Research Institute (ICAR), New Delhi
Dr N. K. Roy (*Alternate*)	
Dr S. Y. Pandit	Bayer (India) Limited, Bombay
Shri D. N. Nakhate (*Alternate*)	
Dr T. N. Parthasarathy	Regional Research Laboratory (CSIR), Hyderabad
Dr P. S. Phadke	Sandoz (India) Limited, Thane
Shri A. V. Natu (*Alternate*)	
Plant Protection Adviser to the Government of India	Directorate of Plant Protection, Quarantine & Storage (Ministry of Agriculture & Irrigation), Faridabad
Dr V. Lakshminarayana (*Alternate*)	
Shri Y. A. Pradhan	Rallis India Limited, Bombay
Shri M. L. Shah (*Alternate*)	
Shri C. Dharma Rao	Pesticides Testing Laboratory, Hyderabad
Shri D. N. V. Rao	Tata Chemicals Limited, Mithapur
Shri C. Neelkanthan (*Alternate*)	
Dr K. K. Saxena	Indofil Chemicals Limited, Bombay
Shri G. Natarajan (*Alternate*)	
Shri A. C. Shroff	Excel Industries Limited, Bombay
Shri P. V. Kango (*Alternate*)	
Shri K. Sundaram	Hindustan Petroleum Corporation Limited, Bombay
Shri B. R. Ajmani (*Alternate*)	
Shri N. S. Venkataraman	Pesticides Testing Laboratory, Kovilpatti
Dr B. L. Wattal	National Institute of Communicable Diseases, Delhi
Shri V. N. Bhatnagar (*Alternate*)	